International Journal of

CONTROL

Consultant Editor:

J. O'REILLY, D.Sc.

Editors:

E. ROGERS, Ph.D.

P. C. YOUNG, Ph.D., C.Eng., F.R.S.S., F.I.M.A.

Associate Editors:

D. J. BELL, D.Sc.
F. LAMNABHI-LAGARRIGUE, d. ès science
D. A. WILSON, Ph.D.

Editorial Board:

Sweden	Professor K. J. ÅSTRÖM
Japan	Professor T. FUKUDA
Germany	Professor R. ISERMANN
Italy	Professor A. ISIDORI
Japan	Professor H. KIMURA
Czech Republic	Professor V. KUČERA
U.S.A.	Professor F. L. LEWIS
U.K.	Professor D. Q. MAYNE, F.R.S.
Switzerland	Professor M. MORARI
U.S.A.	Professor V. I. UTKIN

Volume 67

May 1997 to August 1997

Taylor & Francis
Publishers since 1798

Subscription Information

The *International Journal of Control* (ISSN 0020-7179) is published monthly except semi-monthly in January, March, May, July, September and November (total 18 issues) by Taylor & Francis Ltd, One Gunpowder Square, London EC4A 3DE, U.K.

Annual Subscription 1997: £1285, US$2120.

The current volume of the *International Journal of Control* is available as an electronic on-line edition. Illustrations which are reproduced in black-and-white in this print edition may appear in colour in the on-line edition. Please contact Taylor & Francis for details on subscribing. e-mail: online @tandf.co.uk; Internet: http://www.tandf.co.uk.

Periodical postage paid at Jamaica, New York 11431. U.S. Postmasters: send address changes to *International Journal of Control*, Publications Expediting Inc., 200 Meacham Avenue, Elmont, New York 11003. Air Freight and mailing in the U.S.A. by Publications Expediting Inc., 200 Meacham Avenue, Elmont, New York 11003.

Typeset in the U.K. by Keyword Publishing Services Ltd. and printed at The University Press, Cambridge. The paper used in this publication is 'acid free' and conforms to the American National Standards Institute requirements in this respect.

Dollar rates apply to subscribers in all countries except the U.K. and the Republic of Ireland, where the pound sterling price applies. All subscriptions are payable in advance and all rates include postage. Journals are sent by air to the U.S.A., Canada, Mexico, India, Japan and Australasia. Subscriptions are entered on an annual basis, i.e. January to December. Payment may be made by sterling cheque, dollar cheque, international money order, National Giro or credit card (Amex, Visa, Mastercard/Access).

Orders originating in the following territories should be sent direct to the local distributor. **India:** Universal Subscription Agency Pvt. Ltd, 101-102 Community Centre, Malviya Nagar Extn Post Bag No. 8, Saket, New Delhi 110017. **Japan:** Kinokuniya Company Ltd, Journal Department, P.O. Box 55, Chitose, Tokyo 156. **U.S.A., Canada and Mexico:** Taylor & Francis, Inc., 1900 Frost Road, Suite 101, Bristol, Pennsylvania 19007. **U.K. and all other territories:** Taylor & Francis Ltd, Rankine Road, Basingstoke, Hampshire RG24 8PR, U.K.

Advertising in Taylor & Francis Journals

All advertisement enquiries to: Di Owen Marketing, 15 Upper Grove Road, Alton, Hampshire GU34 1NW, U.K., Tel/Fax +44 (0)1420 89142 (for the world excluding North America.), or Advertising Department, Taylor & Francis Inc., 1900 Frost Road, Suite 101, Bristol, PA 19007, U.S.A., Tel: +1 (215) 785 5800, ext. 35; Fax: +1 (215) 785 5515 (for North America).

Copyright © 1997 Taylor & Francis Ltd

All rights reserved. Authors are themselves responsible for obtaining permission to reproduce copyright material from other sources and are required to sign a form for agreement of the transfer of copyright. All requests from third parties to reprint material held in copyright by Taylor & Francis must be referred to the author for consent as a condition of the granting by Taylor & Francis of permission for reproduction. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form, or by any means, electronic, electrostatic, magnetic, mechanical, photocopying, recording or otherwise, without prior permission in writing from the copyright holder.

Authorization to photocopy items for internal or personal use, or the internal or personal use of specific clients, is granted by Taylor & Francis Ltd for libraries and other users registered with the Copyright Clearance Center (CCC) Transactional Reporting Service, provided that the base fee is paid directly to CCC, 222 Rosewood Drive, Danvers, MA 01923, U.S.A. (For fee per article see copyright code shown on the first page of an article in this journal.) This consent does not extend to other kinds of copying, such as copying for general distribution, for advertising, for creating new collective works, or for resale. Fees for past articles are the same as those shown for current articles.

CONTENTS OF VOLUME 67

NUMBER 1—10 MAY

PAGE

On stochastic modification for global optimization problems: an efficient implementation for the control of the vulcanization process
L. AUTRIQUE and J. E. SOUZA DE CURSI 1

Design of stable systems with uncertainties and constrained performance variations
J. LIU 23

Computation of the maximal robust $\mathscr{H}_2$ performance radius for uncertain discrete time systems with nonlinear parametric uncertainties
K.-Y. ZHAO and J. STOUSTRUP 33

Stabilizing controllers for interconnected systems
A. N. GÜNDEŞ 45

Periodic Lyapunov equations: some applications and new algorithms
A. VARGA 69

Dynamic output feedback compensation for linear systems with independent amplitude and rate saturations
F. TYAN and D. S. BERNSTEIN 89

Exact-output tracking theory for systems with parameter jumps
S. DEVASIA, B. PADEN and C. ROSSI 117

NUMBER 2—20 MAY

Editorial 133

A general framework for state feedback pole assignment of singular systems
D. L. CHU, H. C. CHAN and D. W. C. HO 135

Observer design and detection for nonlinear descriptor systems
D. N. SHIELDS 153

Robust control of discrete critical systems with specifications in the frequency domain
M. DE LA SEN 169

Direct optimal control: a hybrid approach
H. ÖZ and G. YEN 193

Robust discrete-time H_2 control
A. COHEN and U. SHAKED 213

An LMI approach to local optimization for constantly scaled $\mathscr{H}_\infty$ control problems
Y. YAMADA and S. HARA 233

The effects of computational delay in descriptor-based trajectory tracking control
D. VON WISSEL, R. NIKOUKHAH, S. L. CAMPBELL and F. DELEBECQUE 251

PAGE

Neural approximators for nonlinear finite-memory state estimation
A. ALESSANDRI, T. PARISINI and R. ZOPPOLI 275

Correspondence

Comments on 'The effect of sampling period on the behaviour of systems incorporating state feedback'
T. HAGIWARA 303

Comments on 'Design of unknown input observers and robust fault detection filters'
D. KIM and Y. KIM 305

NUMBER 3—JUNE

On the control of sequential machines with disturbances
J. HAMMER 307

Approximate solutions to H_2/H_∞ problems via sequences of H_2-cost/H_2-constraint optimization problems
G. O. CORRÊA, D. M. SALES and T. M. SOARES 333

H^∞ controller design for pure delay and other distributed systems
L. NAIMARK and N. COHEN 355

Hautus condition on the exact controllability of conservative systems
Q. ZHOU and M. YAMAMOTO 371

Stabilization of a class of nonlinear systems through Lyapunov function decomposition
H. MICHALSKA and F. U. REHMAN 381

Robust stable generalized predictive control
B. KOUVARITAKIS, J. A. ROSSITER and G. J. JU 411

Constrained stabilization problem and transient mismatch phenomenon in singularly perturbed systems
H. OLOOMI and B. SHAFAI 435

Normalized coprime factorizations for sampled-data systems
R. K. A. V. ARIPIRALA and V. L. SYRMOS 455

NUMBER 4—10 JULY

A stable control structure for binary distillation columns
F. VIEL, E. BUSVELLE and J. P. GAUTHIER 475

Constrained multivariable generalized predictive control (GPC) for anaesthesia: the quadratic-programming approach (QP)
M. MAHFOUF and D. A. LINKENS 507

Extreme point result for robust stability of discrete systems with complex coefficients in a diamond
K. K. YEN, S. F. ZHOU and G. ROIG 529

Robust adaptive control of induction motors
C.-M. KWAN 539

PAGE

M-controllable subpredicates arising in state feedback control of discrete event systems
S. TAKAI and S. KODAMA 553

Quadratic forms and approximate feedback linearization in discrete time
J. P. BARBOT, S. MONACO and D. NORMAND-CYROT 567

Robust deadbeat regulation
J. LAM, H. K. TSO and N. K. TSING 587

Robust H_∞-estimation of nonlinear discrete-time processes
M. SHERGEI and U. SHAKED 603

Computer-controlled continuous-time variable structure systems with sliding modes
X. CHEN and T. FUKUDA 619

On ARMA controllers in continuous-time feedback schemes
K. YAMANAKA 641

NUMBER 5—20 JULY

Decentralized adaptive control of multiple manipulators in co-operations
Y.-H. LIU, S. ARIMOTO, V. PARRA-VEGA and K. KITAGAKI 649

Cautious stable predictive control: a guaranteed stable predictive control algorithm with low input activity and good robustness
J. R. GOSSNER, B. KOUVARITAKIS and J. A. ROSSITER 675

Detection and estimation of abrupt changes in input or state
P. F. WESTON and J. P. NORTON 699

Output frequencies of nonlinear systems
Z.-Q. LANG and S. A. BILLINGS 713

Gain–bandwidth limitations of feedback systems with non-minimum-phase plants
M. SIDI 731

Parameter bounding identification for state-space systems
M. P. SPATHOPOULOS and I. D. GROBOV 745

Theoretical properties of the ASMOD algorithm for empirical modelling
E. WEYER and T. KAVLI 767

Adaptive dead-zone compensation for output-feedback canonical systems
M. TIAN and G. TAO 791

Robust digital control using multi-rate input sampling
C. S. BERGER and D. PEDUTO 813

Sufficient conditions for robust tracking in nonlinear systems
F. DELLI PRISCOLI 825

NUMBER 6—AUGUST

Nonlinear mixed H_2/H_∞ control for robust tracking design of robotic systems
B.-S. CHEN and Y.-C. CHANG 837

PAGE

Discrete-time adaptive sliding mode control of a linear system in state-space form
C. Y. CHAN 859

Adaptive output feedback control of robot manipulators using high-gain observer
K. W. LEE and H. K. KHALIL 869

Eigenstructure perturbation analysis in disjointed domains for linear uncertain systems
C. R. ASHOKKUMAR and RAMA K. YEDAVALLI 887

State observation, failure detection and isolation (FDI) in bilinear systems
H. YANG and M. SAIF 901

Simultaneous deadbeat tracking control of two plants
C.-M. LIN and T.-D. MENG 921

Optimal anti-windup control of saturating discrete-time MIMO systems
C.-Y.CHEN and M.-H. PERNG 933

Mean-tracking clustering algorithm for radial basis function centre selection
E. L. SUTANTO, J. D. MASON and K. WARWICK 961

A topological analysis of a family of dynamical systems with non-standard chaotic and periodic behaviour
C. HORN and P. J. RAMADGE 979

System-theoretic properties of sampled-data representations of nonlinear systems obtained via Taylor–Lie series
N. KAZANTZIS and C. KRAVARIS 997

The Riemann representation for a PI feedback control around a delay element
P. VANHEEGHE and D. J. BELL 1021

Optimal control for the convergence of a class of discrete event systems
P. ASTUTI and B. J. MCCARRAGHER 1029

Subject Index 1047

Author Index 1051

GE
59
69
87
01
21
33
61
79
97
21
29
47
51